

# MONTHLY WEATHER REVIEW.

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## INTRODUCTION.

This REVIEW for November, 1893, is based on reports from 2,997 stations occupied by regular and voluntary observers. These reports are classified as follows: 154 reports from Weather Bureau stations; 39 reports from United States Army post surgeons; 2,121 monthly reports from state weather service and voluntary observers; 29 reports from Canadian stations; 219 reports through the Southern Pacific Railway Company; 455 marine reports through the co-operation of the Hydrographic Office, Navy Department, and "New York

Herald Weather Service;" 153 weekly reports from 39 U. S. Life-Saving stations; 29 reports from navigators on the Great Lakes; monthly reports from local services established in all states and territories; and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

The WEATHER REVIEW for this month has been prepared under the general editorial supervision of Prof. Cleveland Abbe.

## CHARACTERISTICS OF THE WEATHER FOR NOVEMBER, 1893.

### LOW AREAS.

The principal areas of low pressure have been those attending the storms that passed over the Lake region on the 22d and 23d, the coast of the states of Washington and Oregon on the 6th and 7th, the middle Atlantic coast on the 8th; but, in general, the area of the United States was dominated by high pressures and fair weather. On the other hand, the storms of the Atlantic and Pacific oceans have been more severe than usual; the storm that prevailed over Great Britain and the neighboring portion of Europe on the 16th and 18th seems to have been one of the most severe on record.

### TEMPERATURE.

The average temperature was decidedly below the normal throughout the United States; the deficit being from 2° to 5° throughout the region from the Rocky Mountains eastward to the Appalachian range.

### PRECIPITATION.

The precipitation was generally decidedly above the normal on the coast of Oregon, Washington, and northern California, but below the normal in New England.

The amount of snowfall seems to have been fully up to the normal and the quantity lying on the ground at the end of the month, especially in the northern portion of the Lake region, amounted in many places to 20, 40, and even 60 inches.

### INLAND NAVIGATION.

The rivers have generally remained below the danger line. Owing to ice and snow, navigation on the Lakes had generally closed at the end of the month, and for the same reason navigation on the Missouri above Kansas City, the Mississippi above Keokuk, and the Ohio above Parkersburg had closed.

### ATMOSPHERIC ELECTRICITY.

The auroral display of the evening of November 1 and early morning of the 2d was observed in nearly every state from our northern boundary southward to Virginia and Missouri.

## ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure reduced to sea-level for November, 1893, as determined from observations taken daily at 8 a. m. and 8 p. m. (75th meridian time), is shown by isobars on Chart II, which also gives the so-called prevailing winds, or those most frequently observed at each station.

The normal distribution for November of atmospheric pressure and the direction of the normal wind resultant for each station is shown on Chart V. This chart has been prepared by Prof. H. A. Hazen, who has also prepared all the others of this series preliminary to the publication by the Weather Bureau of specially prepared data and charts showing the meteorological and climatic features and conditions of the United States. The pressures for both Canada and the United States are reduced to sea-level but not to standard gravity by Prof. Hazen's methods and formulæ. The wind

resultants are as given by him at page 124 of his "Meteorological Tables," and are computed by Lambert's formula, giving equal weight to each observed wind without regard to its velocity.

As compared with the preceding month of October the mean pressure for November, 1893, was lower in New England and the Canadian Maritime Provinces, the maximum change being 0.08 at the mouth of the Saint Lawrence; pressure had also fallen in the extreme western part of the state of Washington, the maximum change being .04 at Fort Canby. In all sections of the country the mean for November was higher than for October, the maximum rise being 0.14 at Jupiter, Fla.; 0.11 at Omaha, Nebr., Des Moines, Iowa, and Columbia, Kans.; 0.14 at Winnemucca, Nev.; 0.15 at Battleford, Saskatchewan; and 0.16 at Medicine Hat, Assiniboia.

As compared with the normal for this month the pressures for November, 1893, have been slightly below the normal in